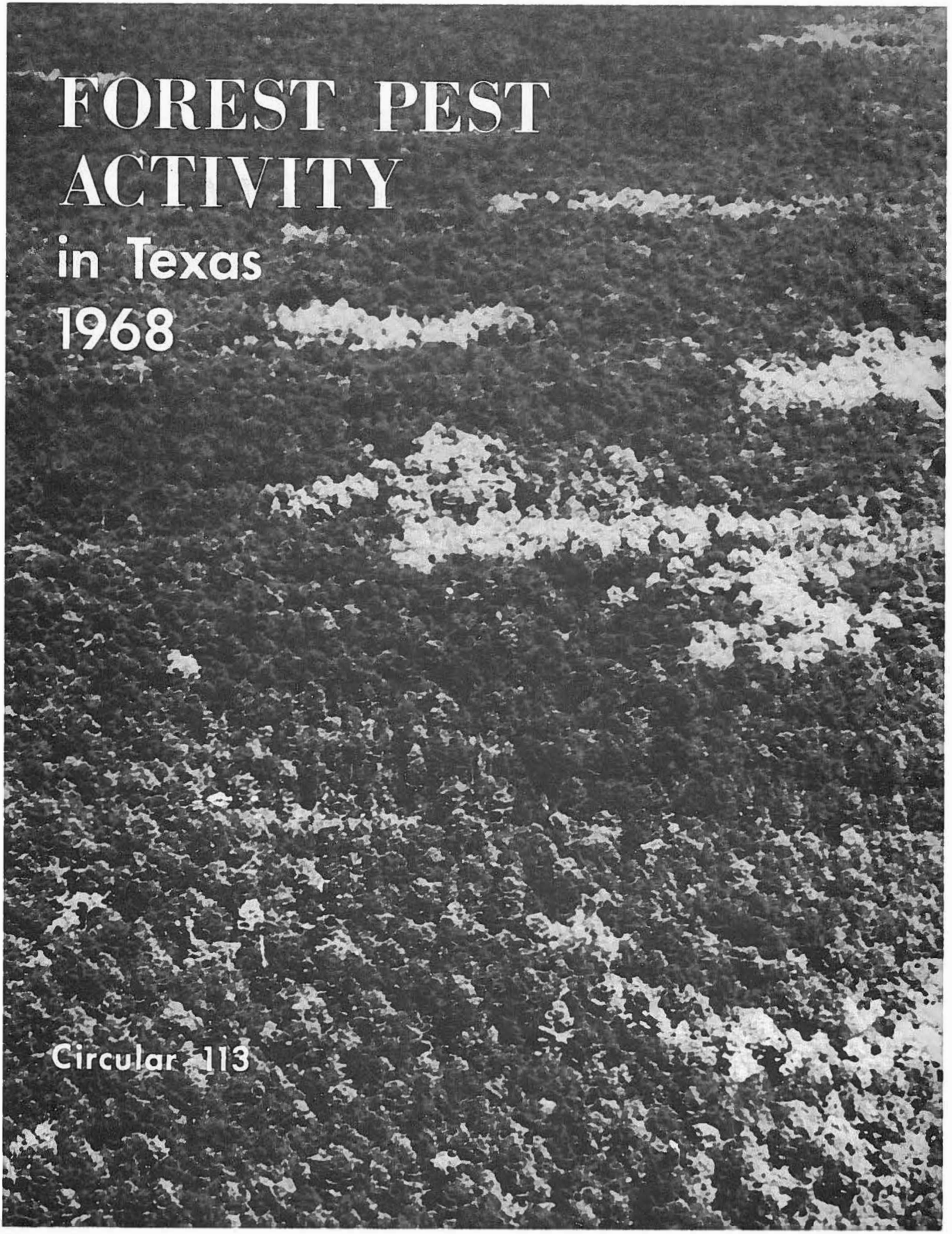

FOREST PEST
ACTIVITY
in Texas
1968
Circular 113

FOREST PEST ACTIVITY
IN TEXAS-1968

by
Max M. Ollieu
and
Garland N. Mason
FOREST PEST CONTROL SECTION
Lufkin, Texas

Private Forest Industry
U. S. Forest Service
Texas Agricultural Extension Service
and
Texas Agricultural Experiment Station
Cooperating

TEXAS FOREST SERVICE
A Part Of
The Texas A&M University System

SUMMARY

Southern pine beetle depredations intensified in 1968 in East Texas. Landowners reported 17,644,000 bd. ft. of sawtimber and 22,037 cds. of pulpwood killed. Utilization, however, removed 53 percent of the killed material. The epidemic area increased by 1.5 million acres during the year to six million acres. Landowners' control costs totalled $483,000.

Nantucket pine tip moth infestations reached serious levels in the central and northern sections of East Texas. A 2000-acre block of naturally reseeded shortleaf pine mixed with lesser amounts of loblolly pine in Red River County were completely killed by this insect.

A Fomes annosus survey late in 1968 revealed that 6.3 percent of the plantations in East Texas were infected. A closer analysis revealed that 76 percent of the thinned plantations were infected, while 96 percent of those which had been thinned for more than 3 years were infected.

COVER: Southern pine beetle infestations in southeast Texas.

FOREST PEST ACTIVITY IN TEXAS-1968

INTRODUCTION

Forest pests cause a considerable amount of destruction to Texas forests each year. The degree of damage varies considerably with many pests, particularly insects, but remains relatively static with diseases such as heartrots. The object of this report is to record these annual losses so that forest pests in East Texas can be better understood. This historical record was made possible by reports from foresters throughout East Texas who represent the Texas Forest Pest Committee.

INSECTS

SOUTHERN PINE BEETLE Dendroctonus frontalis. Above normal summer rainfall and mild temperatures favored Southern pine beetle development in 1968. The amount of merchantable pine timber killed increased 150 percent over the 1967 figure, and the infestation area spread northeast, north and northwest. Approximately six million acres are included in the infestation area, which incorporates all or a portion of 17 counties (Figure 1).

Detection. The Texas Forest Service and forest industry cooperators flew individual sectors to detect Southern pine beetle infestations on state and private lands. Flights were made monthly in January, February, March, October and November, and every two weeks from April through September. Single-engine, high-wing aircraft were flown at an altitude of 1500 feet at 100 miles per hour. Flight lines were spaced $2\frac{1}{2}$ miles apart and spots of five trees and larger were recorded.

New spots detected by month are given in Table 1. As can be seen, the summer peak was reached in late June.

Figure 2 depicts new spots detected each month for the last three years. In 1967, a summer peak occurred in late May. Reports of activity on National Forest lands are not included in Table 1 or Figure 2.

In 1968, the area of infestation remained static in the southern half of the infestation area but advanced northward. A northeast expansion occurred in Polk, Angelina and Nacogdoches Counties: a north expansion occurred in San Augustine County and continued into Shelby County for the first time; and a northeast expansion occurred in Sabine and Newton counties. Acute outbreaks occurred in northern Tyler and Jasper counties, the southern portions of Angelina and San Augustine counties, and along the west bank of the Trinity River in Liberty County below Dayton.

Control. Efforts were made in 1968, to salvage greater amounts of beetle killed timber (Figure 3). Two new pulp mills started production during the year and helped establish a greater demand for salvaged material. Timber buyers were contacted to locate markets throughout the infestation area. By the year's end, more beetle-killed sawtimber and cordwood were utilized than was killed the previous year. The percentage of wood utilized increased from 40 in 1967 to 53 percent in 1968. Wet ground conditions hampered, or made impossible, greater utilization of the infested trees.

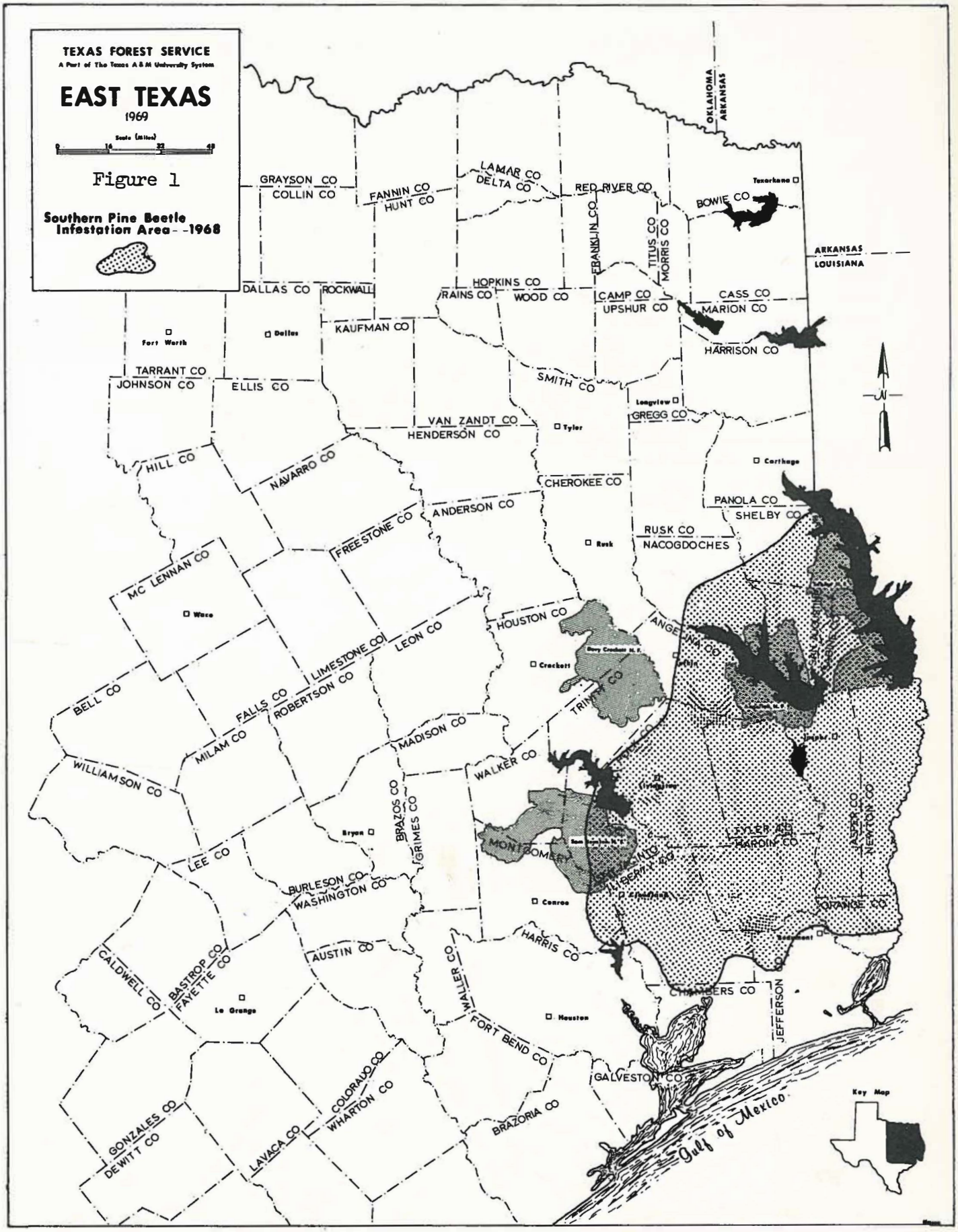

TEXAS FOREST SERVICE
A Part of The Texas A & M University System
EAST TEXAS
1969
Scale (Miles)
0 16 32 48
Figure 1
Southern Pine Beetle Infestation Area--1968
OKLAHOMA
ARKANSAS
ARKANSAS
LOUISIANA
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
BOWIE CO
Texarkana
FRANKLIN CO
TITUS CO
MORRIS CO
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
CASS CO
MARION CO
HARRISON CO
KAUFMAN CO
Fort Worth
Dallas
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
Longview
GREGG CO
VAN ZANDT CO
HENDERSON CO
Tyler
Carthage
HILL CO
NAVARRO CO
CHEROKEE CO
PANOLA CO
SHELBY CO
ANDERSON CO
FREESTONE CO
RUSK CO
NACOGDOCHES
Rusk
MC LENNAN CO
Waco
HOUSTON CO
ANGELINA CO
Davy Crockett N. F.
Crockett
LIMESTONE CO
LEON CO
TRINITY CO
BELL CO
FALLS CO
ROBERTSON CO
MILAM CO
MADISON CO
WALKER CO
WILLIAMSON CO
BRAZOS CO
GRIMES CO
Bryan
MONTGOMERY
TYLER CO
HARDIN CO
JASPER CO
NEWTON CO
LEE CO
BURLESON CO
WASHINGTON CO
Conroe
ORANGE CO
CALDWELL CO
BASTROP CO
FAYETTE CO
AUSTIN CO
HARRIS CO
WALLER CO
La Grange
CHAMBERS CO
JEFFERSON
Houston
FORT BEND CO
GALVESTON CO
GONZALES CO
DEWITT CO
LAVACA CO
COLORADO CO
WHARTON CO
BRAZORIA CO
Gulf of Mexico
Key Map

TABLE 1. Spots Detected By Aerial Observation, 1968.

Month	New Spots Detected
January	30
February	85
March	138
April	266
May	1062
June	1846
July	1514
August	486
September	477
October	220
November	53
December	0
TOTAL	6177

Texas Forest Service records for state and privately owned lands show that 2,993 Southern pine beetle infestations, which contained a total of 236,035 trees, were controlled. The number of trees treated per spot averaged 79. Federal foresters reported that 65,010 trees were either salvaged or chemically treated on the Texas National Forests during the year. It is estimated that another 100,000 trees were utilized and/or treated by landowners. The grand total of trees treated and/or utilized was about 400,000.

The volumes of sawtimber and cordwood killed jumped sharply in 1968 (Figure 4).

FIGURE 2. NEWLY DETECTED SPOTS BY MONTH FOR 1966, 1967 and 1968

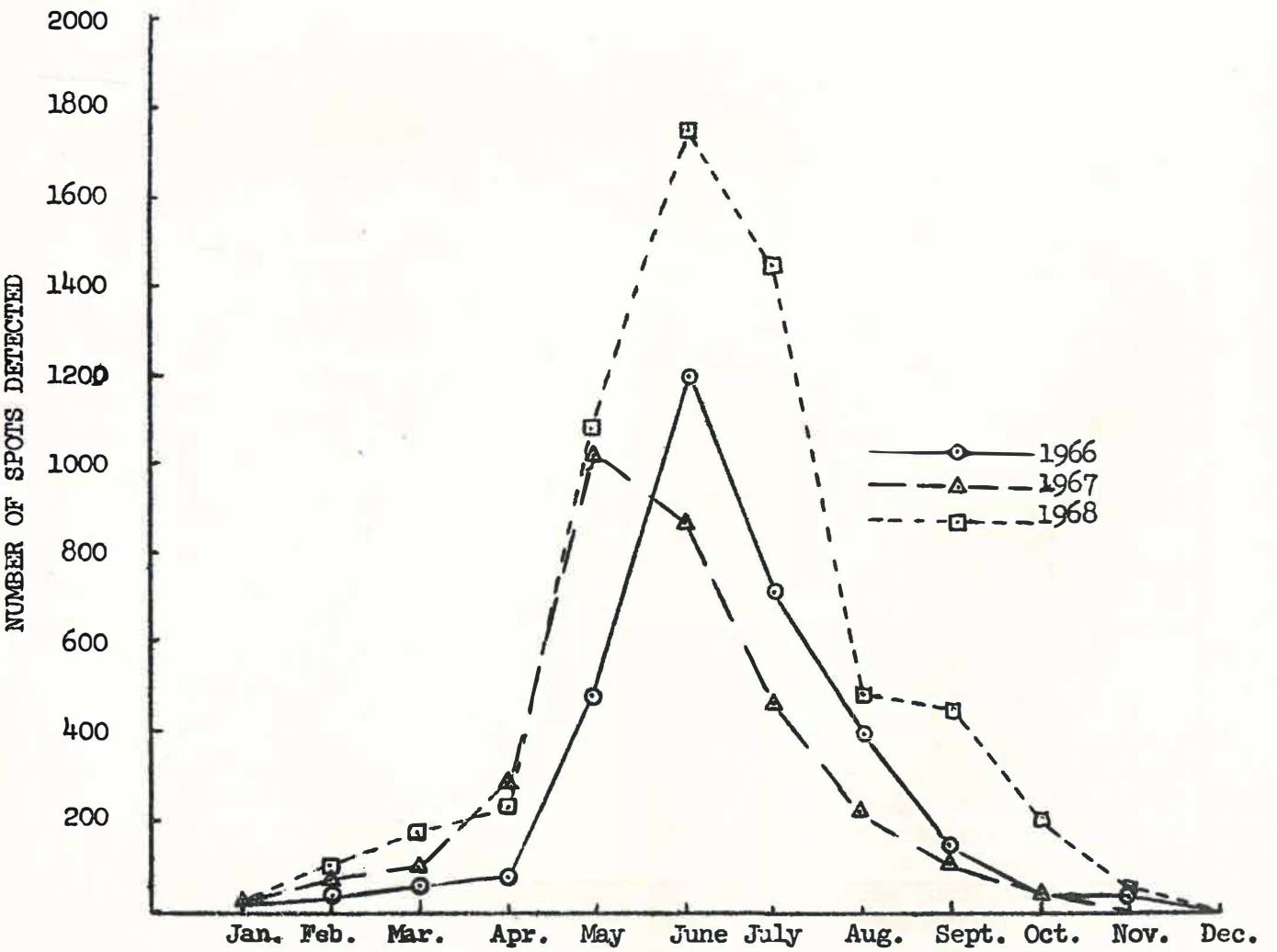
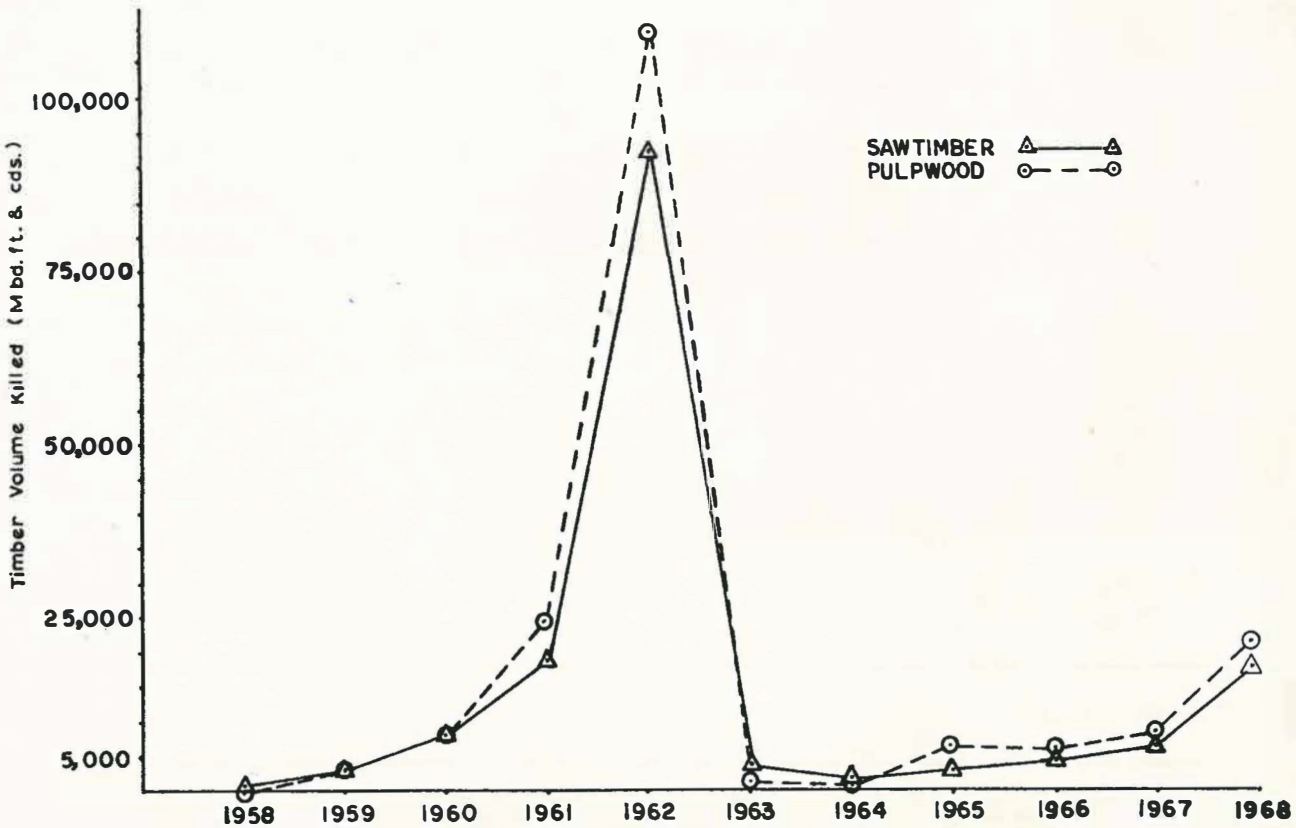


Figure 3. Southern pine beetle infested pulpwood ready to load and transport to the mill.

Figure 4. Annual Timber Volume Killed by Southern Pine Beetle in East Texas.



According to Table 2, sawtimber killed by the beetles increased by 10½ million board feet and pulpwood increased by 13,500 cords over the 1967 figures (Table 2). Total acreage of pine timber killed during the year reached 4,073. The largest infestation was a 200-acre kill south of Dayton. Total expenditures by landowners to control southern pine beetle were $483,000 during the 1968 calendar year.

BLACK TURPENTINE BEETLE Dendroctonus terebrans. Abundant precipitation in 1968 made conditions more favorable for the black turpentine beetle than the previous year. Logging, lightning, road building and fire also seemed to help perpetuate infestations. Reports of damage came from only three counties in the first half of the year but from twelve in the last half. Counties reporting damage were Houston, Liberty, Montgomery, Newton, Orange, Panola, San Augustine, San Jacinto, Shelby, Trinity, Tyler and Walker (Figure 5).

Chemical treatment was applied to 1709 infested pines; most were on National Forest land. A mixture of one percent gamma isomer BHC in fuel oil served as the insecticide. The U. S. Forest Service discontinued chemical treatment in the latter part of the year because its effectiveness on the low-to-moderate population level was questioned and because funds were short.

Emphasis on utilization of infested trees stimulated the removal of several thousand heavily damaged pines. Landowners were urged to check their pines in bottomland sites, especially after logging, for attacks of black turpentine beetle and to remove damaged trees (Figure 6).

ENGRAVER BEETLES Ips avulsus, Ips grandicollis and Ips calligraphus. A buildup of Ips beetles in 1967 carried over into the early months of 1968. The population decreased with the continued rains and presented only small problems the remainder of the year. Counties which reported significant Ips buildup

TABLE 2. Volume of Pine Timber Killed by the Southern Pine Beetle in Southeast Texas since 1958.

Year	Sawlogs (thousand bd. ft.)*	Pulpwood (cords)*	Total (thousand cu. ft.)*
1958	500	0	84
1959	2,500	2,500	598
1960	8,000	8,000	1,912
1961	17,887	24,000	4,715
1962	93,043	111,110	23,538
1963	4,084	1,920	820
1964	2,501	1,420	520
1965	3,797	7,743	1,192
1966	6,256	6,930	1,544
1967	7,194	8,566	1,818
1968	17,644	22,037	4,533
GRAND TOTAL	163,406	194,226	41,274

* Conversion factors: 167 cu. ft./M. bd. ft. and 72 cu. ft./cd.

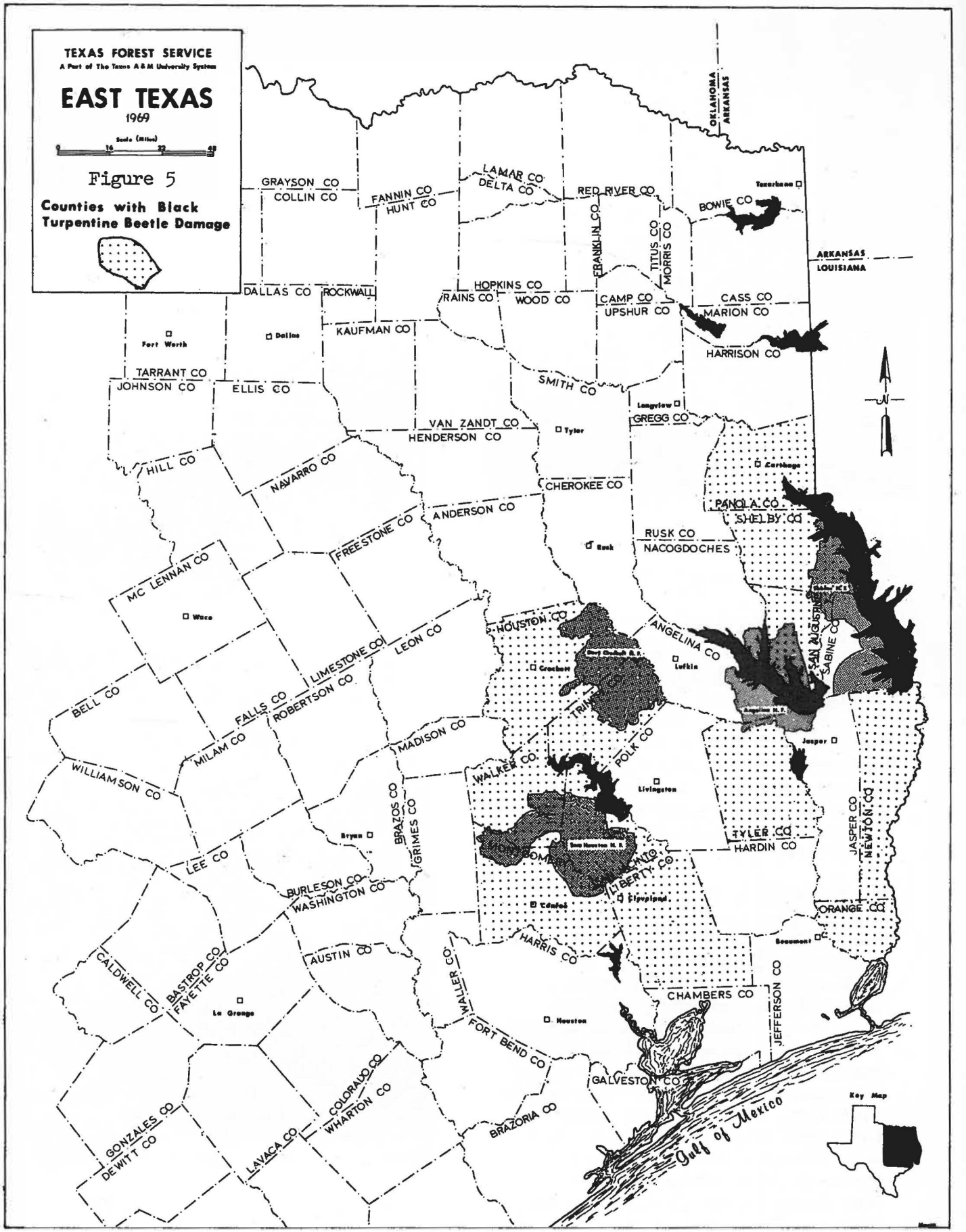

TEXAS FOREST SERVICE
A Part of The Texas A&M University System
EAST TEXAS
1969
Scale (Miles)
0 16 32 48
Figure 5
Counties with Black Turpentine Beetle Damage
OKLAHOMA
ARKANSAS
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
BOWIE CO
FRANKLIN CO
TITUS CO
MORRIS CO
ARKANSAS
LOUISIANA
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
CASS CO
MARION CO
HARRISON CO
KAUFMAN CO
Fort Worth
Dallas
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
Longview
GREGG CO
VAN ZANDT CO
HENDERSON CO
Tyler
HILL CO
NAVARRO CO
Carthage
CHEROKEE CO
PANOLA CO
SHELBY CO
RUSK CO
NACOGDOCHES
Rusk
MC LENNAN CO
Waco
FREESTONE CO
ANDERSON CO
HOUSTON CO
ANGELINA CO
Lufkin
SAN AUGUSTINE CO
SABINE CO
Crockett
LIMESTONE CO
LEON CO
BELL CO
FALLS CO
ROBERTSON CO
MILAM CO
MADISON CO
Jasper
WILLIAMSON CO
WALKER CO
POLK CO
Livingston
BRAZOS CO
GRIMES CO
Bryan
TYLER CO
HARDIN CO
JASPER CO
NEWTON CO
LEE CO
BURLESON CO
WASHINGTON CO
LIBERTY CO
Cleveland
ORANGE CO
Beaumont
HARRIS CO
AUSTIN CO
CALDWELL CO
BASTROP CO
FAYETTE CO
La Grange
WALLER CO
CHAMBERS CO
JEFFERSON CO
Houston
FORT BEND CO
GALVESTON CO
GONZALES CO
DEWITT CO
COLORADO CO
WHARTON CO
LAVACA CO
BRAZORIA CO
Gulf of Mexico
Key Map

Figure 6. Loblolly pine heavily attacked by black turpentine beetle on bottomland site.

were Angelina, Colorado, Henderson, Jasper, Nacogdoches, Newton, Orange, Panola, Smith and Trinity.

A mixture of one-half percent gamma isomer BHC in fuel oil was applied to 135 Ips-killed trees in Jasper County. A total of 748 Ips-killed trees were salvaged on Texas National Forests in Angelina and Trinity counties.

DEODAR WEEVIL Pissodes nemorensis. Overwintering broods of the deodar weevil from last year's buildup emerged in April and May. The insect apparently aestivates until fall before commencing to feed, breed, and deposit its eggs (Figure 7). The second consecutive year of damage was observed to start in September in closely grown roadside loblolly. Mortality was heavy in localized areas of Angelina County.

Numerous loblolly pine stem terminals were damaged throughout East Texas in the fall and winter months. This was the most ubiquitous symptom of attack expressed during 1968. Close examination of loblolly pine leaders killed by P. nemorensis revealed that stem terminals had occasionally been killed for three successive years. Brood emergence holes were visible in the old leaders.

There are four distinct types of damage which loblolly pines express when attacked by P. nemorensis. First, seedlings and saplings are often killed quickly by the adults. Second, stem terminals of trees 15-40 feet tall may have the top killed. Open grown trees in old fields exhibit this symptom most often. Third, a tree of any size may be severely attacked by the weevil with a loss of nearly all needles except those at the branch ends at the top of the crown. Fourth, scattered branches may be flagged and this suggestion by other workers appears to hold true in Texas.

Figure 7. Pissodes weevil adult on loblolly sapling.

RED-HEADED PINE SAWFLY Neodiprion lecontei. A buildup of this forest pest occurred north of Houston on a 125-acre plantation of loblolly and slash pines (Figure 8). Loblolly was the preferred species and defoliation was complete (Figure 9). A large portion of the saplings was killed. The slash pines received only occasional attacks. Since the site favored slash pine, so the owner chose to replant with that tree species.

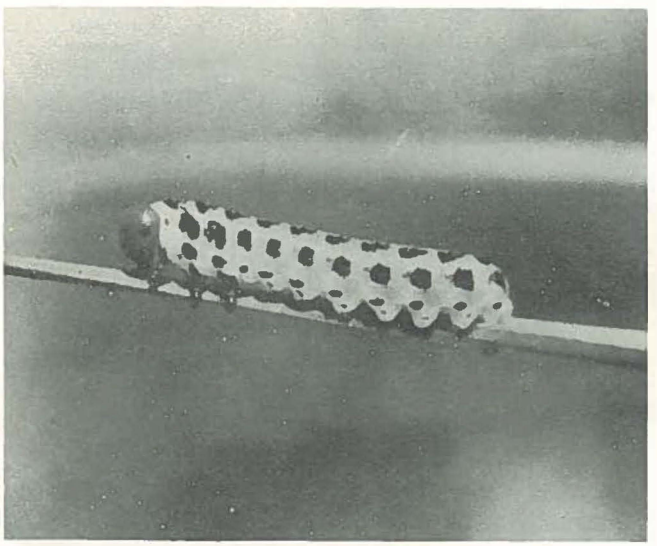


Figure 8. Larva of red-headed pine sawfly in Montgomery County plantation.

Figure 9. Loblolly pine saplings defoliated by red-headed pine sawfly. Note undamaged slash pine in background.

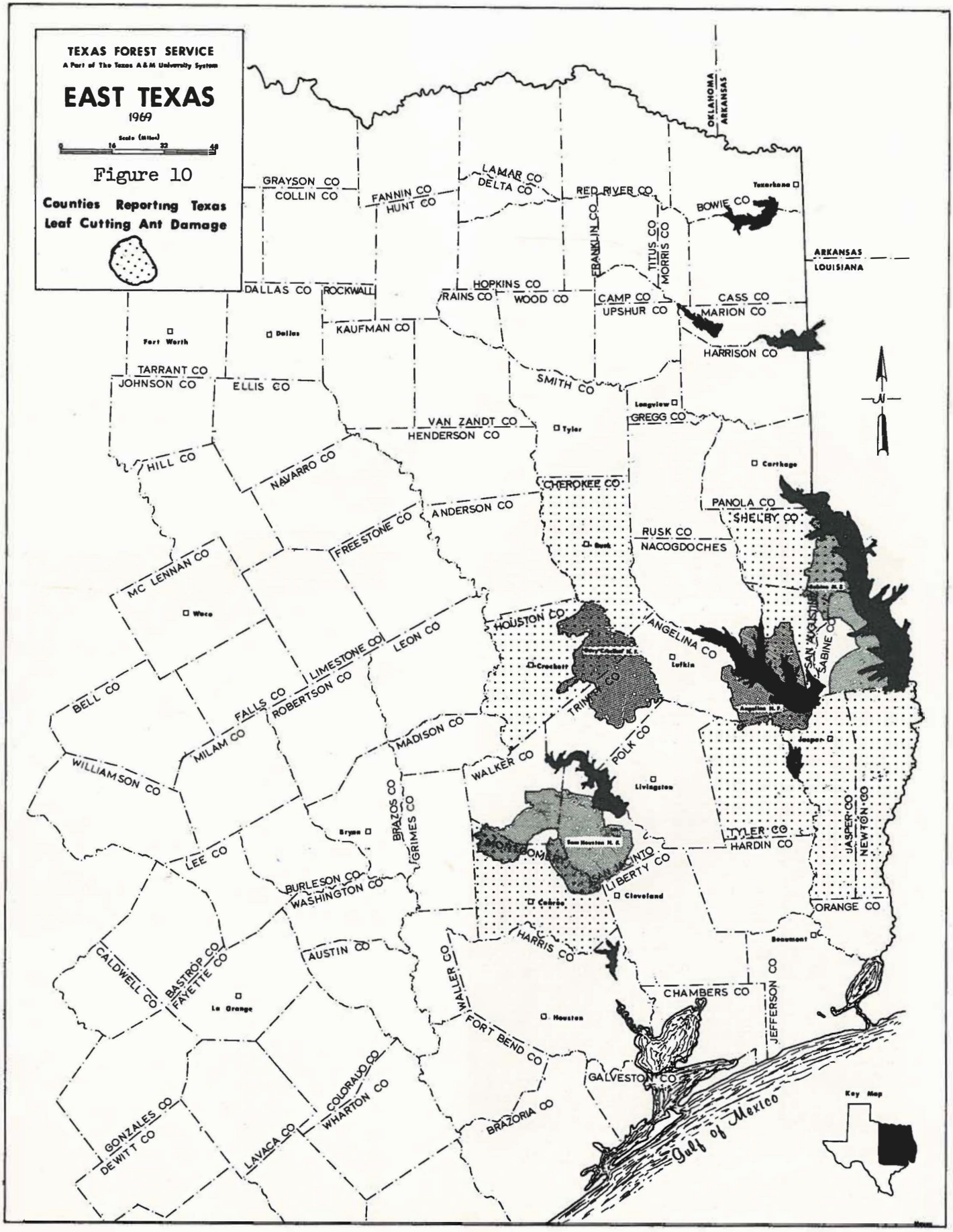
TEXAS LEAF CUTTING ANT Atta texana. Texas foresters face serious damage from Texas leaf-cutting ants when sandy sites are reforested. Seedlings with needles and even the stem removed during the winter are probably the most commonly observed victims in infested plantations. Seedlings in cleared, direct-seeded sites also have been attacked, as have young pines in seed-tree tracts.

Landowners reported that 7,000 acres were treated for control of A. texana in 1968 (Figure 10). Counties in which control took place were Cherokee, Houston, Montgomery, Jasper, Newton, San Augustine, Shelby and Tyler. Control was accomplished through the use of 2000 pounds of Mirex 450 pelleted ant bait and 10 pounds of Methyl bromide.

NANTUCKET PINE TIP MOTH Rhyacionia frustrana. A serious buildup of Nantucket pine tip moth occurred for the first time in several years in 1968. Shortleaf and loblolly pines received light to heavy damage from central East Texas to northeast Texas. Loblolly pine in an isolated plantation north of Houston was also heavily attacked.

The most severe outbreak occurred in extreme northeast Texas in Red River County. A 2000-acre block of overstocked, naturally reseeded shortleaf pine mixed with lesser amounts of loblolly pine had nearly all tips attacked, including new shoots put out in the summer. The stand essentially lost one year of vertical growth.

Although control of tip moths is possible with various chemicals, use of 10 percent granular Thimet has given best results on Texas Forest Service seed orchards. Control under forest conditions has not been recommended. Application is made at the rate of 2 ounces of granules per inch of stem diameter at the ground line, raked into the soil. A February application appears to give season-long control.


TEXAS FOREST SERVICE
A Part of The Texas A&M University System
EAST TEXAS
1969
Scale (Miles)
0 16 32 48
Figure 10
Counties Reporting Texas Leaf Cutting Ant Damage
OKLAHOMA
ARKANSAS
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
FRANKLIN CO
TITUS CO
MORRIS CO
BOWIE CO
Texarkana
ARKANSAS
LOUISIANA
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
CASS CO
MARION CO
HARRISON CO
Fort Worth
Dallas
KAUFMAN CO
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
Longview
GREGG CO
VAN ZANDT CO
HENDERSON CO
Tyler
HILL CO
NAVARRO CO
Carthage
CHEROKEE CO
PANOLA CO
SHELBY CO
ANDERSON CO
FREESTONE CO
RUSK CO
NACOGDOCHES
MC LENNAN CO
Waco
HOUSTON CO
ANGELINA CO
SAN AUGUSTINE CO
SABINE CO
Lufkin
LIMESTONE CO
LEON CO
BELL CO
FALLS CO
ROBERTSON CO
TRINITY CO
MILAM CO
MADISON CO
Jasper
WILLIAMSON CO
WALKER CO
POLK CO
Livingston
BRAZOS CO
GRIMES CO
Bryan
MONTGOMERY
SAN JACINTO
LIBERTY CO
TYLER CO
HARDIN CO
JASPER CO
NEWTON CO
LEE CO
BURLESON CO
WASHINGTON CO
Cleveland
ORANGE CO
Beaumont
CALDWELL CO
BASTROP CO
FAYETTE CO
AUSTIN CO
HARRIS CO
WALLER CO
La Grange
Houston
CHAMBERS CO
JEFFERSON CO
FORT BEND CO
GALVESTON CO
GONZALES CO
DEWITT CO
LAVACA CO
COLORADO CO
WHARTON CO
BRAZORIA CO
Gulf of Mexico
Key Map

COTTONWOOD LEAF BEETLE Chrysomela scripta. An aerial spray program was held in 1965 and 1966 and again in 1968 to minimize cottonwood defoliation. The applications were made to plantations of U. S. Plywood-Champion Papers Inc. A mixture of dieldrin and malathion was applied in the 1968 application to a 400-acre block of cottonwood planted in Walker County.

CONE INSECTS. Damage by this group of forest pests remains chronically high year after year. Inspection of conelets and cones on several branches in the Texas Forest Service slash and loblolly pine seed orchards in 1968 showed that insects had attacked 3 percent of the loblolly conelets and 17 percent of the loblolly cones. Four percent of the slash cones had been attacked. A larger portion of cone losses had to be ascribed to aborts and unknown causes. Considering all losses over a two-year period, the loblolly pines suffered a 49 percent loss and the slash pines a 45 percent loss.

The most destructive cone insect was Dioryctria amatella. Other cone insects which cause occasional losses are Laspeyresia sp., Dioryctria clarioralis and Rhyacionia frustrana. Two plant bugs, probably Leptoglossus corculus and Tetyra bipunctata, feed on immature endosperm within the seed and are quite common in the seed orchards. A small cecidomyiid fly was observed to cause premature case-hardening of cones. The beetle Pityophthorus pulicarius also infested many conelets but whether its action was primary or secondary to conelet death could not be determined.

Systemic insecticides in the form of 10 percent granular Thimet and Di-syston were applied to the soil in the Texas Forest Service seed orchards for cone insect control. Results were disappointing, but a hint of control was obtained in a two-year Thimet test of 1 pound per tree. Different dosages and application techniques are planned for 1969.

DOUGLAS-FIR BEETLE Dendroctonus pseudotsugae. A West Texas survey in September revealed 30 Douglas-fir to be killed or dying from Douglas-fir beetle. Another 5-tree spot was detected but not ground checked. All trees were located in the breaks of McKittrick Canyon in the Guadalupe Mountains.

Terrain is rough and accessible only by foot trail; therefore ground checks are arduous. The area is a portion of the proposed Guadalupe National Park.

WESTERN PINE BEETLE Dendroctonus brevicomis. Occasional single dying ponderosa pines were detected in the Guadalupe and Davis Mountains. Two of these pines were ground checked on Black Mountain in the Davis Mountains. Both were infested with western pine beetle, as was a nearby green-crowned tree (Figure 11).

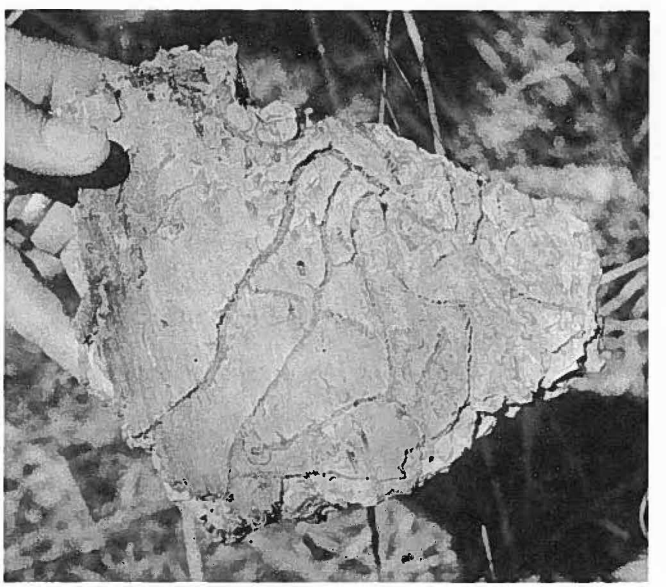


Figure 11. Inner surface of ponderosa pine bark etched by western pine beetle galleries.

BUDWORM Choristoneura sp. probably occidentalis. Douglas-fir in the Guadalupe Mountains displayed defoliation by a budworm. Leader and branch terminal needles were reduced to stubs and covered with fine webbing. Upper portions of the crowns suffered the worst damage.

DISEASES

ANNOSUS ROOT ROT. Fomes annosus appears to be the most destructive forest disease in East Texas. A survey was conducted on a portion of East Texas timberlands in late 1968 to determine the extent of infection and the severity of the disease to pine plantations. During this survey, 415 plantations were plotted on maps from a low-flying aircraft. Over 350 of the plantations were checked on the ground for annosus infection. From the survey samples, there are more than 2400 plantations in East Texas. Of these 2400 plantations, 66 percent are in the 0-10 age class, 23 percent in the 11-20 class, and 10 percent in the 21-30 class, while only 0.6 percent are more than 30 years of age.

Only 8.3 percent of the total plantations had been thinned; 6.3 percent of these were infected with annosus. A closer analysis revealed that 76 percent of the thinned plantations were infected and 96 percent of those which had been thinned for more than three years were infected.

The survey also revealed a relatively uniform number of infections through the area; however, severity was observed to be much greater in the northern areas.

The above data have provided information on which more detailed investigations can be based. Rate-of-spread plots have been established in several infected areas to determine annosus severity by soil type, geographic location, and species, and to evaluate the overall impact of annosus on pine plantation management in East Texas.

Observations indicate that annosus may die out in certain areas after a short period of time. If this is the case, perhaps managers of large holdings, on short management rotations, can economically absorb these losses rather than expend large sums of money necessary for prevention. Further investigations are planned for the coming year to determine whether annosus dies out or merely becomes dormant, ready to begin when conditions again become favorable.

Reporting cooperators applied borax to freshly cut stumps in more than 350 acres of thinned plantations. An additional 6,000 acres of pine plantations were prescribed burned with annosus control as one of the primary objectives. Prescribed burning is not a recommended control practice; however, it is recognized that the reduction of pine litter would create conditions which would be unfavorable for sporophore production, thereby reducing inoculum potential.

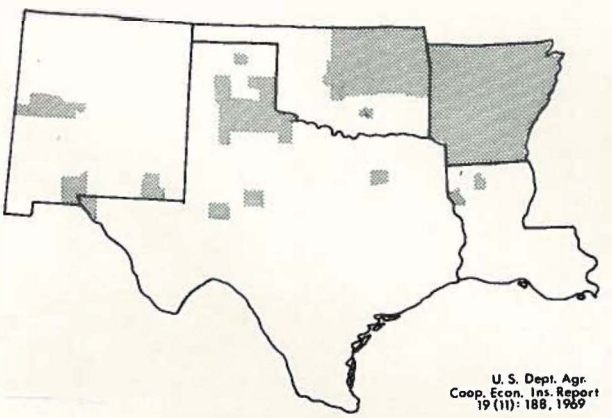
FUSIFORM RUST. Cronartium fusiforme has never been considered a real problem in East Texas; however, numerous young pine plantations observed during the Fomes annosus survey indicated a heavy rust infection. Recent discussions with industry foresters revealed that much of their silvicultural thinning operations are based entirely upon the removal of rust infection trees. A survey to determine infection severity by pine species, age class, geographic location, and climatic variation is planned for 1969.

Routine applications of Fermate are scheduled every 7 to 10 days, from early April until late June, to prevent infection of planting stock in the Texas Forest Service Indian Mound Nursery near Alto. Recommended control for forest infections is by selectively removing infected trees during management operations.

DUTCH ELM DISEASE Ceratocystis Ulmi. A survey of Dutch elm disease in the upper High and Rolling Plains of Texas was conducted by the Texas Agricultural Extension Service in 1967. A number of samples were examined in 1968, but none have proven to be Dutch elm disease.

The disease is transmitted by the small European elm bark beetle which has been collected in Texas and adjoining states (Figure 12). Dutch elm disease has been present in Oklahoma for some time and remains a threat to Texas elms. Any unexplainable elm mortality should be thoroughly investigated.

Figure 12. Distribution of Smaller European Elm Bark Beetles (Scolytus multistriatus) in Texas and adjoining States.



NEEDLE CAST OF PINE. This disease is caused by one of several fungi which produce dieback and premature shedding of pine needles. Although the disease is rarely of economic importance, an occasional tree may die from continued attacks.

Infection is characterized by needle browning and a "scorched" appearance. The affected needles generally drop after several weeks and may be replaced by a flush of new needles.

DWARF MOSS. Observations in Fayette County indicated widespread attack of live oak trees by dwarf moss. Numerous trees were apparently killed by the organism, although it is not reported to be parasitic. Damage apparently results when the growth becomes very thick, shades the bud and prevents new tissue from developing. The only known control is through mechanical removal.

WESTERN GALL RUST. Peridermium harknessii was detected for the first time in Texas on ponderosa pine in the Davis Mountains of West Texas. The disease causes trunk cankers and branch galls on most species of two-and-three needled pines in the West (Figure 13).

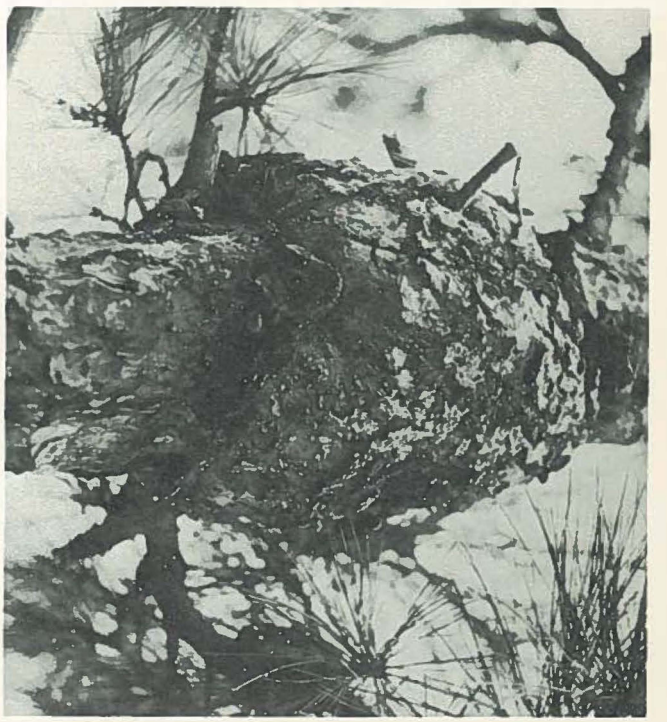


Figure 13. Western gall rust infection on ponderosa pine, Jeff Davis County.

ANIMALS

PORCUPINE Erethizon dorsatum. Feeding by porcupine causes partial to complete girdling of woody plants. Ponderosa pine and Douglas-fir are occasionally attacked. Fading tops or branches are good aerial indicators of damage. Damage has remained constant during the two years of the West Texas survey.

GOPHERS Geomyidae. Applications of poison grain were necessary in Houston and Sabine Counties to control gophers. Populations of the pest were high on the sites prepared for pine planting. Hand applications of the grain were made prior to planting.